is formed in the cultures by the bacilli, which (the dose used varied between 0.2 and 0.4 of a gram) produced, a few hours after the injection, a rise of temperature amounting to 1° or 2° C., lasting for one or two days, without any other effect even after repeated injections. The glycerine bouillon cultures lost their virulence on being kept for eight months at a temperature of 39° C., but they retained their vital activity. In experiments made on animals with such cultures of eight months' standing, only negative results were observed with regard to the production of immunity in animals by such cultures; and Hammerschlag, Falk, and Charrin have failed to produce a protective inoculation.

Physical and Chemical Changes in the Blood in Disease.

Dr. Sciolla of Genoa, at the Congress of the Italian Society of Internal Medicine, reported some interesting experimental rearches on physico-chemical changes of the blood in different morbid conditions. He stated, according to the *Lancet*, that the density of the blood diminishes during acute febrile states and the first stages of convalescence, increasing afterward with greater or less rapidity according to the nature of the disease. The same thing is always observable in the density of blood-serum, with this difference, that it begins to increase as soon as there is any improvement in the condition of the patient; sometimes, indeed, a short time previously. The density of the serum is increased in malaria, while that of the blood is diminished. Tuberculous affections, unaccompanied by serious alterations of the blood, only slightly modify the density of blood-serum and blood. The densities of blood-serum and blood are both diminished in catarrhal jaundice, probably owing to defective assimilation of food. The density of the blood is almost normal, while that of the serum is increased, in cirrhosis of the liver and in cancer of the gall-bladder. The densities of blood and serum are not sensibly diminished in benign forms of diabetes. The greatest diminution in the density of the blood is observable in diseases accompanied by grave morbid changes of the blood. The most striking examples were those seen in three fatal cases of pneumonia. Dr. Sciolla also observed the chemical modifications of the blood in pneumonia, typhoid-fever, malaria, anæmia, and in leucæmia. About the fourth or fifth day of croupous pneumonia there is a marked diminution in the albuminoid substances of the blood, especially the globulin. The extractive matters increase during the febrile period. In convalescence the quantity of albuminoids, especially of the globulin, and also that of the serin, increased. The dry residue of the blood is not much diminished during the first stage of the disease, but it so during the second stage, and continues less until convalescence. In typhoid-fever the albumens of the blood diminish progressively (unless the diarrhœa is excessive), and this diminution occurs at the expense of the serin. The extractive matters gradually diminish during the whole of the febrile period, and even during the early stage of convalescence. In malarial fevers the amount of the albuminoids in the blood-serum (especially the serin, and in a less degree the globulin) and the dry residue of the blood diminish rapidly, while the dry residue of the serum and the extractive matters of the serum increase with the duration of the fever,—the former in a slight degree, the latter enormously. In chloro-anæmia the albumens of the serum (especially the globulin) and the dry residue of the blood diminish, while the dry residue of the serum increases. In leucæmia the amount of dry residue of the serum is very high, and the albuminoids of the serum are also above the normal, the serin being especially increased.

NOTES AND NEWS.

THE expedition which is to be sent in the spring to the west coast of Greenland, by the committee of the Karl Ritter Endowment, is likely to be one of considerable importance. The chief of the expedition, as we learn from *Nature* of Feb. 5, will be Dr. E. von Drygalski; Dr. O. Baschin will accompany it, defraying his own charges; and there will be a third scientific expert, who has not yet been selected. Dr. von Drygalski proposes to establish a station near the Umanackfjord, in about 70° 30′ north latitude, where Dr. Baschin will carry out a continuous series of meteorological observations, and from which he can make long or short excursions inland to study the interior ice. It is expected that the party will remain in Greenland about a year.

— Two Frenchmen, Dr. Besson and Père Tulazac, have succeeded in making the first ascent to the summit of Ambondrombo, dreaded by the Betsileos as sacred, or *tabu*. They, however, found five Betsileos willing to accompany them to the top. According to the January "Proceedings of the Royal Geographical Society," the party started from Amboasary, the nearest village to the mountain, and reached the summit in seven hours. Axes and knives had frequently to be used to clear the way. The mountain is rugged and wooded, reaching a height of 6,234 feet. The party had to cross many ravines during the ascent.

— From Dorsetshire, England, a singular instance of starlings being eaten by rooks is reported (*Nature*, Feb. 5). It seems that during the very severe weather there this winter, a flock of starlings was observed on a farm at West Stafford, near Dorchester, followed by a number of rooks in hot pursuit. The larger birds soon came up with their prey, and quickly despatched them, and, after stripping them of their feathers, devoured them then and there. When the scene of the occurrence was inspected just afterwards, the ground was found to be strewn with their feathers, but beyond these not a vestige of the starlings could be discovered. It seems that the rooks, from sheer hunger, must have been driven to this extremity, owing to the scarcity of other kinds of food.

— A method of repairing incandescent lamps, the invention of a M. Pauthonier, is described in a recent number of *L'Electricien*. The lamp to be repaired is first taken to a glass-blower, as quoted in *Engineering* of Feb. 6, who pierces a hole in the bulb sufficiently large to allow of the old filament being taken out and a new one inserted. From the hands of this workman the lamp passes to a second, who cuts off the ends of the broken filament and removes it, taking care, however, at the same time to leave about one millimetre of the filament at each of the platinum electrodes; and it is to these short lengths of the old filament that the new one is welded. This is done by filling the bulb with a liquid hydrocarbon, after which the new filament, which has been previously standardized, is introduced. One end of the filament is then pressed against the fragment of the old one already referred to, and a current passed through the joint. The hydrocarbon is decomposed, and a deposit of solid carbon occurs round the joint, and securely fastens the new filament in place. The other end of the filament is joined to the other electrode in the same way. The next process is the bleaching of the glass, which is so thoroughly done that the glass of the repaired lamps is said to be more brilliant and transparent than that of perfectly new ones. The repaired lamps are said to last quite as long as new ones, to which they are in no respect inferior. The process is said to be peculiarly adapted to the repair of lamps of the "Sunbeam" type.

— To stimulate the collection of photographs to be used in showing the need of improved roads in the United States, the Connecticut division joins the New York division of the League of American Wheelmen in offering three prizes aggregating $100, as follows: one prize of $50 for the best collection of not less than three photographs, one prize of $30 for the second best collection of not less than three photographs, one prize of $20 for the third best collection of not less than three photographs. There are wanted photographs showing the common spectacle of the farmer's team and wagon, hub-deep and knee-deep in the muddy road; photographs showing rough, rutty, and muddy roads in their worst condition; photographs showing the every-day break-down caused by rough or muddy roads or steep grades; photographs showing smooth, hard-surfaced roads and (if possible) teams hauling loads over the same; and other pictures illustrating the goodness of good roads and the badness of bad roads. The prizes will be awarded before May 15, 1891. Further information will be furnished on application to either Isaac B. Potter, 278 Potter Building, New York, N.Y., or Charles L. Burdett, Hartford, Conn.

— According to the latest observations which Dr. Finsterwalder has published, as stated in *The Scottish Geographical Magazine* for February, the region occupied by advancing glaciers is extending from west to east, and has lately crossed the limits of the eastern Alps. The glaciers in this region have been receding during the last thirty years, but now there is undeniable proof that those of the Ortler group, at any rate, are in a state of progression.

— Assistant E. D. Preston of the United States Coast and Geodetic Survey will soon go to the Hawaiian Islands for the purpose of making a series of latitude observations, to be used in connection with others to be made by several of the countries who are connected with the International Geodetic Association. The question of a change in the position of the earth's axis has led to some special refinements in the method of observing astronomical latitudes. Whatever may be the cause of the supposed motion of the pole, whether it results from the shifting of volumes of the atmosphere or water above the surface, or the movement of liquid or semi-liquid masses within the earth's crust, the quantity to be measured is so small that it is necessary to reduce the uncertainty of the determination to a very few feet. The observations at Honolulu soon to be taken up simultaneously by the United States Coast and Geodetic Survey and the International Geodetic Association of Europe will decide whether the variation is a purely local one or whether there is a real change in the position of the axis of rotation. Observations made last year in Europe, and also in this country by Professor Comstock at Madison, Wis., seem to indicate that there is an interference between the motions of the axis of rotation and the axis of inertia, producing a maximum every year in the mean motion, and a larger maximum at the end of five years. In Europe the minimum of 1890 was 0.20″ smaller than the minimum of 1889. Besides, the Greenwich observations of latitude for the last sixty years show there is a long period of inequality of at least this length. In order to bring out these small changes, the following precautions will be taken in the execution of the work: no zenith distances greater than 30° will be used, and differences of zenith distances shall not be more than 12′; stars will be chosen so that any error in the value of the micrometer-screw will be eliminated, and the preference will be given to stars whose proper motions are well known; the barometer and thermometer will be read in order to note atmospheric changes. The Coast and Geodetic Survey representative, Mr. Preston, will also avail himself of the opportunity to make magnetic and gravity observations at a number of points on the islands, including one station on the summit of Mauna Kea at an elevation of 14,000 feet. Some meteorological observations will probably be made as well. The following instruments will be taken: a zenith telescope for the regular international latitude work, a meridian telescope (or combination instrument) for time and latitude observations at the pendulum stations, and a theodolite-magnetometer and dip circle for magnetic observations. The pendulums for the gravity observations will be of a new pattern, very portable, and will be observed by means of an elegant method of coincidences devised by Professor Mendenhall.

— The monthly report for January of Arthur Winslow, State geologist of Missouri, states that only such field-work has been done as was necessary to complete those divisions of work which were included among the operations of the past season. Thus, in Jackson County some little field-work was done to complete the examination of the clay and building-stone industries of the western counties; and in Randolph, Howard, and Lafayette Counties instrumental levelling was done in order to determine the altitudes of various coal-beds. But the bulk of the work during the past month has been in the office, where the members of the survey are engaged in plotting the results of surveys made during the past summer and autumn. In addition, they have been busy correcting the proof of Bulletin No. 3, and in preparing the manuscript of the biennial report and of Bulletin No. 4 for the printer. Bulletins Nos. 2 and 3 have been printed, and about a thousand copies of each have been distributed. Bulletin No. 2 is a bibliography of the geology of Missouri, the manuscript of which was prepared and donated to the survey by Mr. F. A. Sampson of Sedalia. It is a valuable work of reference, and will be of great use to all who are interested in the geology of Missouri and her minerals. Bulletin No. 3 contains papers on the clay, stone, lime, and sand industries of St. Louis City and County, and on the mineral waters of Johnson, St. Clair, Henry, and Benton Counties. These papers contain a mass of facts concerning the subjects to which they relate, in addition to statistics of production. They are, however, provisional publications; and the results of analyses and tests now in progress, together with other matter not yet ready for presentation, are reserved for the final report on these special subjects, which it is hoped will be prepared this year. In the laboratory, analyses of clays and mineral waters have been prosecuted, and 136 determinations have been made. In addition, a number of substances sent in by various citizens of the State have been determined and reported upon.

— The third annual meeting of the Association of American Anatomists was held Dec. 29 and 30, 1890, in the anatomical lecture-room of the Harvard Medical School, Boston, Mass. It was presided over by Dr. F. D. Weisse, second vice-president, and Dr. Thomas Dwight acted as secretary *pro tem.* Papers were read as follows: "Corrosion Preparations," by Dr. S. J. Mixter; "Studies on the Spine," by Dr. Dwight; "A Comparison of the Fibrine Filaments of Blood-Lymph in Mammalia and Amphibia," by Professor S. H. Gage; "The Semi-Lunar Bone," by Professor Shepherd; "The Structure of Protoplasm and Mitosis," by Dr. Carl Heitzmann; "The homology of the Cerebrospinal Arachnoid with the Other Serous Membranes," by Professor F. W. Langdon; "The Occlusion of the Rhinocœle (Olfactory Ventricle) in the Dog," by Mr. P. A. Fish; and three papers—"The Relations of the Olfactory to the Cerebral Portion of the Brain," "The Brains of a Cat and of a Sheep lacking the Callosum," "Owen's Nomenclature of the Brain, with Suggestions based Thereon"—by Professor B. G. Wilder. With one exception, the papers were illustrated by specimens, photographs, or diagrams, and all were fully discussed. The committee on anatomical nomenclature (Professors Leidy, Harrison Allen, Frank Baker, Thomas Dwight, T. B. Stowell, and B. G. Wilder) were authorized to publish as their second report "such general and specific recommendations as may be unanimously agreed upon by them." The following were elected members: Dr. W. W. Dana of Portland, Me.; Dr. John C. Munro of Boston, Mass.; Mr. Pierre A. Fish of Ithaca, N.Y. The next meeting will be held at Washington, D.C., in September, 1891, at or about the time of meeting of the Congress of American Physicians and Surgeons. The officiers for that meeting are as follows: president, Joseph Leidy; vice-presidents, Frank Baker, F. D. Weisse; secretary and treasurer, D. S. Lamb; executive committee, Harrison Allen, Thomas Dwight, and B. G. Wilder.

— It is reported, says *The Engineering and Mining Journal*, that an organization is in progress of formation at Youngstown, O., which will be one of the strongest in iron circles in the United States, representing an investment of $7,735,000. The body will be known as the Mahoning & Shenango Valley Iron Manufacturers' Association, and includes the iron manufacturers of both valleys. These concerns include twenty-two furnace stacks, thirteen rolling-mills, one pipe-works, and one wash-metal plant. The output of pig iron is 1,200 tons annually and 450,000 tons of finished iron, while the number of men employed will exceed 2,000. It is the first time in the history of the iron business in eastern Ohio and western Pennsylvania that the iron manufacturers have been united.

— M. H. Coudreau has completed the first part of the mission of exploration in the basin of the river Oyapock, Guiana, with which he was intrusted by the French Government. The traveller, when among the mountains of Emerillons, between the Inipi and the Appronague, was abandoned by his guides. This misfortune, which occurred in January, 1890, caused the loss of much valuable time, so that the work of exploration had to be undertaken during the rainy season. The results of this winter campaign are as follows ("Proceedings of the Royal Geographical Society," Jan.): The seven chief affluents of the Oyapock, which

drain the whole of the south east of the country, were surveyed on the scale 1:100,000: five out of the seven were ascended by the traveller up to their sources. His surveys include about 430 miles of quite unexplored country, besides 235 miles of new work on the Oyapock. Two of these tributaries carried him right into the heart of the Tumuc Humac Range, where he was able to study the native languages. He has collected twenty-five hundred words of the Oyampi language. The whole of the south-east region abounds in marshes, and presents a desolate picture. On all sides are the ruins of Indian villages. Small-pox and dysentery, and a steady emigration to the south-west of the country, are rapidly thinning the population; so that a generation hence, M. Coudreau says, the south east will be practically uninhabited. The Creoles may, however, be attracted to this region on account of its auriferous character, but it will not be easily exploited owing to the numerous falls in the rivers. In July last the travellers was about to start upon the second portion of his work. He intended to navigate the Oyapock to its source, cross the Tumuc Humac Mountains to the southern side, and visit the Indians living near the sources of the Tapanahony by a new route. Thence he will reach the Itany, descend the Aoua, and return across the whole central part of French Guiana. This central journey will occupy eight months.

— A course of five lectures on the ethnology of modern Europe, by Dr. D. G. Brinton, was begun Monday afternoon, Feb. 16, at the Academy of Natural Sciences of Philadelphia. The subjects of the different lectures are as follows: 1. "The Predecessors of Modern European Nations;" 2. "The Romance and Hellenic Nations (France, Spain, Portugal, Italy, Greece, etc.);" 3. "The Teutonic Nations (Germans, Danes, Swedes, English, etc.,—Celtic Remnants);" 4. "The Slavonic Nations (Russians, Poles, etc.);" 5. "The Allophyllic Peoples (Basques, Finns, Hungarians, Turks, etc.)." These lectures are free, and tickets may be obtained of the secretary of the academy, Dr. E. J. Nolan.

— In a communication to the French Physical Society, M. Cailletet has described a method of connecting a metal tube or stop-cock to a vessel of glass or porcelain so that the joint shall be tight even under high pressures. As described in *Engineering*, the process is simple, and consists in first coating the glass or porcelain vessel with a very thin layer of platinum at the part where the connection is to be made. This may be done by painting the glass, after slightly warming it, with a neutralized solution of platinic chloride mixed with the essential oil of camomile. The layer of oil and platinic chloride is then slowly heated till the last traces of oil have been expelled, and the temperature is then raised to a dark-red heat. The chloride is thus reduced, and the platinum deposited as a bright metallic mirror on the surface of the glass. On this layer of platinum a second layer of copper is deposited by electrolysis, and the metal stop-cock or tube can then be soldered by means of tin to this copper ring. M. Cailletet states that he has found these joints to remain tight under a pressure of 300 atmospheres.

— A theory attempting to explain the nature of the relationship between the optical activity of many substances in solution, and the hemihedrism of their crystalline forms, is advanced by Dr. Fock, the author of the new work on chemical crystallography, in *Berichte*, and quoted in *Nature* of Feb. 5. It is certainly a most significant fact that all those substances whose solutions are capable of rotating the plane of polarization of light, and whose crystalline forms have been thoroughly investigated, are found to form hemihedral crystals; that is to say, crystals some of whose faces have been suppressed, and whose two ends are therefore differently developed. Moreover, in those cases where both the right rotatory and left rotatory varieties of the same chemical compound have been isolated and examined, as in the case of dextro- and lævo-tartaric acid, the hemihedral crystals are found to be complementary to each other, the faces undeveloped upon the one being present upon the other, so that the one is generally as the mirror-image of the other. Several ingenious attempts to account for the wonderful geometrical arrangement of the molecules in a crystal have been made of recent years by Bravais, Mallard, and others, who developed the "Raumgitter" theory, and by Sohncke, who showed that all possible crystallographical forms could be referred to systems of points; yet it has been found necessary by these crystallographers to assume a polarity of the molecule itself in order to fully explain the phenomenon of hemihedrism. This conclusion is, moreover, borne out by the more recent work of Lehmann upon his so-called "liquid crystals." It is, indeed, evident that hemihedral crystals owe their hemihedrism to a differentiation of the various parts of the molecules themselves in space. Dr. Fock assumes, for the purpose of connecting this fact with the optical rotation of the dissolved crystals, the tetrahedral form for the element carbon, in the most recent conventional sense employed by Wislicenus, Van't Hoff, Victor Meyer, and other exponents of the new "stereo-chemistry." The axis of polarity of a molecule containing an asymmetric carbon atom, will, of course, be determined by its centre of gravity and the heaviest "corner" of the tetrahedron; and Dr. Fock shows that rotation of the molecule will be most easy round this axis, and in the direction, right or left, determined by the relative weights of the atoms or groups disposed at the other three "corners." He further shows, that, if we consider any direction of vision through the solution, we must practically consider two positions of the molecules, in both of which the axis of rotation is parallel with our line of sight, and in one of which the apex of the tetrahedron is turned towards us, and in the other is directed away from us and the other three corners presented to us. As the molecules are, of course, in rapid motion, we must consider all other positions as balancing each other, and being resolved eventually into these two directions. It is then easy to see, as it is now accepted from Fizeau's work that the movement of molecules is capable of influencing the direction of light-waves, that there must be two oppositely moving circularly polarized rays produced. Now, it is generally supposed that the rotation of liquids is really due to the division of the light into two circularly and oppositely polarized rays, one of which, however, is stronger than the other, and determines the apparent optical activity. Dr. Fock completes his theory by showing the probability that there would be just this difference in the amount of rotation of the light in the two cases of the differently disposed molecules, those with their "apices" turned towards the direction of incidence of the light affecting it to a different extent from those whose "bases" were the first to receive it. The theory is well worth following out in the original memoir, many confirmations of it being adduced from other properties of hemihedral crystals.

— Señor Felipe Poey, the renowned Cuban philosopher and naturalist, is dead. He was born in Havana, May 26, 1799, and studied law in Madrid, where he was implicated in a political conspiracy, and from whence he fled to Paris. There he published in 1828 "La Centurie des Lépidopteres," and helped to found the French Entomological Society. He returned to Havana after the revolution of 1830, was commissioned in 1837 to organize a museum of natural history, and became one of its directors. Soon afterwards he was appointed professor of natural history in the University of Havana. In 1840 he published a school geography of the Island of Cuba, and in 1842 a more extensive work on the same subject, and a "Geografia Universal." In 1864 he published "Memorias Sobre la Historia Natural de la Isla de Cuba," with Spanish, French, and Latin text. In 1865 he started a monthly periodical entitled *Repertorio Fisico-Natural de la Isla de Cuba*, in which he described upward of two hundred and thirty new species of fishes, as well as the *ciguatera*, or jaundice, caused by eating certain Cuban fishes. He also published some remarkable poems. He was a member of the Smithsonian Institution, and a corresponding member of the French Academy of Sciences.

— Some time ago M. Berthelot, judging from a text of the eleventh century, formed the opinion that the word "bronze" was derived from "Brundusium," or Brindisi. We learn from *Nature* of Jan. 29 that this view has been confirmed by the discovery of a passage in a document of the time of Charlemagne, where reference is made to the "composition of Brundusium;" copper, two parts; lead, one part; tin, one part. It would appear that at Brundusium bronze was in ancient times manufactured on a great scale.